

TOUCH INPUT SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is an application under 35 USC 111(a) and claims priority under 35 USC 119 from Provisional Application Serial No. 60/281,457, filed Apr. 4, 2001 under 35 USC 119(b).

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to a touch input system for use with an information display system. More particularly, the present invention is directed to an optical touch input system for use with a flat panel display.

[0004] 2. Introduction to the Invention

[0005] Touch input systems have become ubiquitous throughout industrialized countries.

[0006] These systems have replaced or supplemented conventional input systems, such as a keyboard or mouse in many applications, including for example, information kiosks, retail point of sale, order input, e.g. restaurants, and industrial line operations. Various types of touch input systems are currently in the marketplace. These include acoustic, resistive, capacitive and infrared. The present invention is directed primarily to infrared touch input systems. As with most technologies, a key to market penetration is improving quality and performance while reducing production costs. The present invention addresses at least one of these aspects in that it enables for reduced part count and the resulting savings in costs. The present invention also provides for touch analysis which in turn improves the system performance.

[0007] The present invention will typically be used in conjunction with some type of information display system, for example a flat panel display connected to a computer system. Typically, the computer system provides a variety of screens on the display illustrating a selection of objects that may be selected by a user. When the user touches one of the objects the touch input system communicates the location of the touch to the computer system. The information display system typically includes two pairs of oppositely disposed sides that define an information display area.

BRIEF SUMMARY OF THE INVENTION

[0008] In a first aspect this invention provides a touch input system, comprising a frame having a first pair of opposed sides positioned parallel to a first axis and a second pair of opposed sides positioned parallel to a second axis, the second axis being perpendicular to the first axis, each of the second pair of sides connecting the first pair of sides, all four sides defining a generally rectangular touch input area, a linear array of light emitting devices along each side, and a light detection device positioned at each corner of the frame.

[0009] In a second aspect this invention provides a touch input system, comprising a touch screen comprising a frame having a first pair of opposed sides positioned parallel to a first axis and a second pair of opposed sides positioned parallel to a second axis, the second axis being perpendicular to the first axis, each of the second pair of sides connecting

the first pair of sides, all four sides defining a generally rectangular touch input area, a linear array of light emitting devices along each side, and a light detection device positioned at each corner of the frame; and a controller coupled to the light emitting devices and the light detection devices, wherein the controller sequentially activates each linear array and activates the light detection devices positioned at corners of the frame opposed to the activated array of light emitting devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective view of a touch input system of the present invention.

[0011] FIG. 2 is a planar, schematic view of a touch input system of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The information display system may include a flat panel display having two pairs of oppositely disposed sides (S_1 , S_2 , S_3 , and S_4) defining an information display area I. The touch input system 10 of the present invention may include a frame L having two pairs of oppositely disposed sides (L_1 , L_2 , L_3 , and L_4) defining an open area corresponding in size and shape to the information display area I. Each of the sides of the touch frame includes a linear array of a light emitting devices (E_1 , E_2 , E_3 , and E_4). In a preferred embodiment, the light emitting devices are organic light emitting devices (OLEDs) that emit light in the infrared (IR) range. The touch input system 10 also includes a light detecting device (D_1 , D_2 , D_3 , and D_4) positioned at each corner of the frame L. In a preferred embodiment the light detecting device is an IR phototransistor. In a preferred embodiment, the touch input system 10 includes a light transmissive prism (P_1 , P_2 , P_3 , and P_4) positioned along and adjacent each linear array of light emitting devices (E_1 , E_2 , E_3 , and E_4) such that light emitted from the light emitting devices is directed across the information display area I. By activating the plurality of arrays and the individual light emitting devices within each array in a defined sequence and simultaneously activating specific ones of the light detecting devices, the touch input system of the present invention can determine the location of a touch on the information display area I.

[0013] Referring to FIGS. 1 and 2, the present invention may be clearly understood. The information display system includes a display device, for example a flat panel display having four sides (S_1 , S_2 , S_3 , and S_4) defining an information display area I. In a preferred embodiment, the touch input system 10 includes a frame L having four sides (L_1 , L_2 , L_3 , and L_4) defining an opening corresponding in size and shape to the information display area I. In an alternate embodiment, the frame may overlay a portion of the area defined by the four sides of the display device, therein providing less usable display area for touch applications. The touch input system 10 includes a linear array of light emitting devices (E_1 , E_2 , E_3 , and E_4) along each of the four sides of the frame L_1 , L_2 , L_3 , and L_4 , respectively. Each array includes a plurality of individual light emitting devices. In the illustrated embodiment, each array includes N light emitting devices however the system may have a different number of devices in each array. Typically, the number of devices in